System Specification

End-to-End Gateway Demonstration, Thor DP1

Checkout and Launch Control System (CLCS)

84K00302-006

End to End Gateway Data Demonstration Thread Assessment
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Assessment Team

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1. Introduction

1.1 End to End Gateway Data Demonstration Thread

This thread will demonstrate the ability to collect data from all CCMS link types. The purpose of this thread is to lay the foundation for orbiter power up in Atlas.

Highlights:

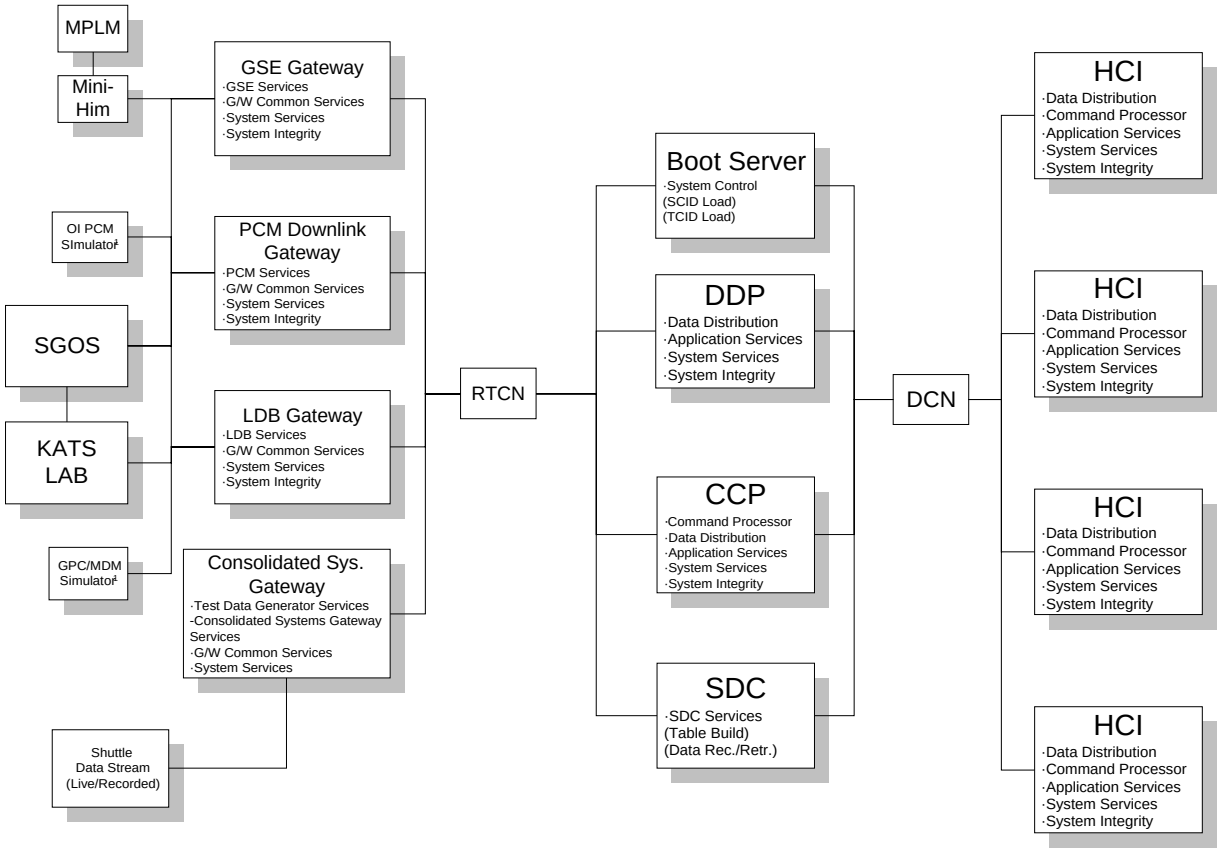
- Produce the equivalent data stream produced by the Consolidated System Gateway using real Gateways.
- Provide displays for all data types on all links.

Demonstrate data collection and transfer from the Video Simulation Interface thru the Gateway, DDP and HCI for those displays

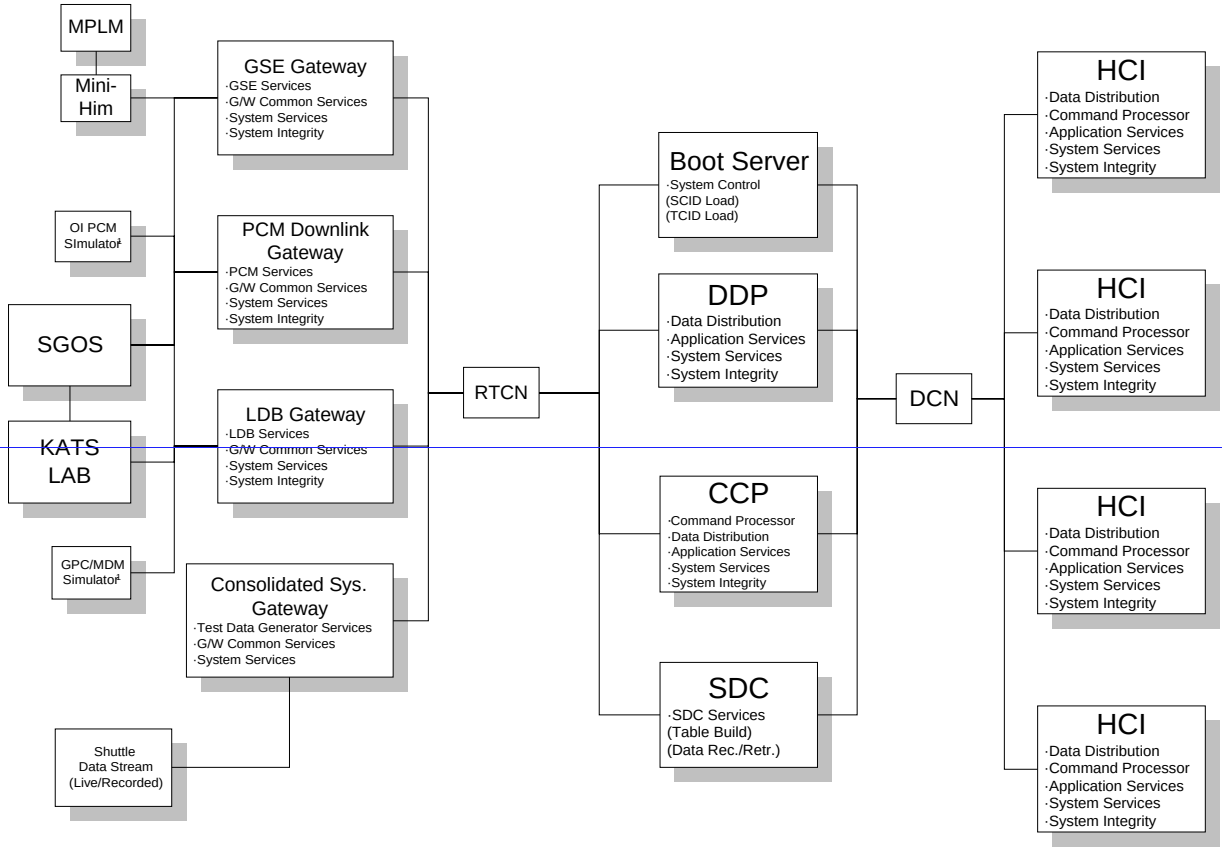
1.2 End to End Gateway Data Demonstration Thread Concept

To provide End to End Gateway Data Demonstration support as defined in the Thor Delivery Document Section 6.2.4 requires support from all other major CLCS Systems.

End to End Gateway Data Demonstration Thread Concept Diagram



1. Gateway Team developed test tools



1. Gateway Team developed test tools

1.3 End to End Gateway Data Demonstration Thread Specification

1.3.1 Statement of Work

- Demonstrate 1 Ground Support Equipment Links, 1 PCM link, 1 Space Shuttle Main Engine link, and limited Launch Data Bus.

  (Note: Space Shuttle Main Support will not be provided for Thor)

- Demonstrate capability to change PCM formats.
- Demonstrate capability to change scan rate of Ground Support Equipment FD's
- Demonstrate capability for enabling and disabling processing on FD's.

~~**Need clarification.**~~

- Demonstrate capability to process and distribute all samples of FD's.
- Demonstrate capability to change Calibration and Engineering Units Conversion of FD's.
- Provide a set of displays that display all data types for the links being demonstrated.
- Demonstrated these displays with the Consolidated System Gateway.
- Demonstrated these displays with the real gateway and Video Simulation Interface.

1.3.2 Requirements

SLS Requirements Addressed in this thread:

N/A

All SLS requirements relating to this thread are covered in PCM Downlink Servicecs CSCI, GSE Services CSCI, and LDB Services CSCI.

- ~~Performance measurement demonstration~~

1.4 End to End Gateway Data Demonstration Thread Hardware Diagram

See concept diagram in Section 1.2.

1.5 End to End Gateway Data Demonstration Thread Deliverables

Software:

The Test Data Generator CSC will be modified to support to add to test FD's and set the values with a predefined algorithm. THDS capability is required by Data Distribution.

Deliverable	R&D Document	Code	API Manual	Users Guide
Test Data Generator CSC				X

Hardware:

A second Test Data Generator will be deploed in SDE-2, IDE-1, and SDE-JSC

Deliverable	R&D Document	Drawings	Prototype	Users Guide

Deliverable	R&D Document	Drawings	Prototype	Users Guide
Test Data Generator HWCI				X

1.6 End to End Gateway Data Demonstration Thread Assessment Summary

1.6.1 Labor Assessments

No.	CSCI/HWCI Name	Thor LM	Changes covered in
1	Test Data Generator CSC	~~TBD~~ 2	End to End Gateway Data Demonstration Thread
2	Test Data Generator HWCI		End to End Gateway Data Demonstration Thread
3	GSE Services CSCI		GSE and Gateway Common Services Completion Thread
4	PCM Services CSCI		PCM Interface Thread
5	LDB Services CSCI		LDB Interface Phase 1 Thread
6	Gateway IRIB Interface Board HWCI		GSE and Gateway Common Services Completion Thread
7	GCP Common Services CSCI		GSE and Gateway Common Services Completion Thread
8	Test Build & Control		PCM Interface Thread Completion Thread
9	System Services CSCI (System Control CSC)		System Services Enhancement Thread
10	Command Support CSCI		Commanding and Command Processor Phase 2 Thread
11	Data Distribution		Data Distribution Completion Thread
12	System Services		
13	Application Services		Data Distribution Completion Thread/ Commanding and Command Processor Phase 2 Thread
14	System Viewer		System Viewers Thread
15	Data Recording/Archival and Retrieval		Log, Record and Retrieval Phase 1 Thread
	Total	2~~TBD~~	

1.6.2 Hardware Costs

The total Hardware Costs required to provide this capability are summarized in the following table:

Item number	Name	Unit Cost	Qty.	Total	Assumptions
1	FEPC	$5,000	2	$10,000	

1.6.3 Procurements

Hardware procurement activities are in work. Scheduled delivery date all hardware is 9/26/97.
Status: Complete

1.7 End to End Gateway Data Demonstration Thread Schedule & Dependencies

1.7.1 Schedule

Task Name	Start	Finish
Thor Assessment Kickoff	9/8/97	9/8/97
Concept Panel Internal Review	9/23/97	9/23/97
Concept Panel	9/25/97	9/25/97
Thor Development		
Test Data Generator Services CSCI Requirement Panel Internal Review	11/4/97	11/4/97
Test Data Generator Services CSCI Requirement Panel	11/6/97	11/6/97
Test Data Generator Services CSCI Design Panel Internal Review	11/4/97	11/4/97
Test Data Generator Services CSCI Design Panel	11/6/97	11/6/97
Test Data Generator Services CSCI Unit Testing	10/13/97	11/6/97
Test Data Generator Services CSCI Development Integration Test	11/7/97	11/14/97
Test Data Generator Services CSCI Formal Integration Test	11/17/97	11/21/97
Support System Integration Test	11/21/97	3/27/97
Thor Development Complete	3/27/97	3/27/97

1.7.2 Dependencies

No.	Dependency Area	Dependency	Need Date
2	Gateway O/S	VxWorks SENS Release (IP Mulicast Support)	10/1/97

1.8 End to End Gateway Data Demonstration Thread Simulation Requirements

The End to End Gateway Data Demonstration Thread will utilize the existing LPS Simulation System with the math models. The GSE, PCM and LDB Gateways in SDE 1 and SDE 2 will be connected to the VSIs in the LCC via the PCC RCVS and the GSE, PCM and LDB Gateway in the IDE 1 will be connected to the VSIs via the VSI T/R System. All simulations will be conducted in the real-time mode.

1.9 End to End Gateway Data Demonstration Thread Integration and System Test

End to End Gateway Data Demonstration Thread testing is composed of two major activities:

- Formal Verification of Test Data Generator CSC.
- System Integration and Test will develop a test plan and test procedures to verify end to end data flow through the system.

1.10 End to End Gateway Data Demonstration Thread Training Requirements

None.

1.11 End to End Gateway Data Demonstration Thread Facilities Requirements

None.

1.12 End to End Gateway Data Demonstration Thread Travel Requirements

From	To	Reason	No. People	Duration	Est. Date or Frequency
KSC	JSC	Test Data Generator Deployment	2	3 Days	12/97

Status: Complete.

1.13 End to End Gateway Data Demonstration Thread Action Items/Resolution

The Gateway Team does not have sufficient personnel to complete the Test Data Generator tasks detailed in this assessment. A new software revision is possible. However, the team does not have resources to develop and complete design panel materials for the Test Data Generator CSCI, CIT Procedures, etc.

2. End to End Gateway Data Demonstration Thread CSCI Assessments

2.1 Test Data Generator Assessment

The Test Data Generator will be modified to support the addition of two FDs and the capability to modify the FDs with a predefined algorithm.

Basis of estimate

CSC Name	CSC Labor (LM)	% of CSC
Test Data Generator	2	100

Documentation

New operations procedures will be developed.

Document Type	New/Update	Number of Pages
Requirements and Design Documentation	update	tbd
Users Guide	update	tbd
API Interface Document	n/a	n/a
Interface Design Document	n/a	n/a
Test Procedure	update	tbd

Assumptions

None

Open Issues

Personnel availability to complete Test Data Generator Modifications, Design Panel Documentation, Test procedures, update operations procedures.

3. End to End Gateway Data Demonstration Thread HWCI Assessments

N/A

4. COTS Products Dependencies

4.1 SW Products Dependency List

Product Name	Quantity Needed	Need Date
VxWorks SENS Release	1	10/1/97

Status: Beta 2 release received and is in the process of being installed.

4.2 HW Products Dependency List

Product Name	Quantity Needed	Need Date
SPANS PCI Expansion Modules	3	10/17/97
100BaseT PMC Modules	6	10/1/97
SCSI Disk Drives	3	10/1/97
MVME 2604 SBC w/ 761 Module	3	10/1/97

Status: All required hardware modules for the Thor delivery have been received.

5. Final Commentary:

The primary objective of this thread is to demonstrate CLCS change data processing on all link types. The GSE, PCM Downlink, and LDB Threads all contain link related processing requirements that will be tested in their respective CITs. Preliminary application display requirements~~requriements~~ have been identified in those threads as well and will be utilized to demonstrate link thread capabilities. Thus, demonstration of PCM Downlink, GSE, and LDB processing in those threads in effect satisfy the objective of this thread.

The subject of man power problems for TDG development was discussed in the preliminary thread panel and has not been resolved. It is believed that the software required to provide the additional capability can be readied to support Data Distribution dependencies. Unless manpower issues are resolved, formal treatment of the TDG Services CSCI for Thor is not possible. Given the maturity of the existing TDG software and the level of scrutiny it has already endured, I do not believe this situation is detrimental to the project. Therefore, formal TDG Services CIT plans for Thor should be deleted.